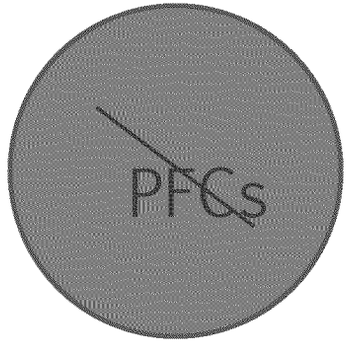
PFAS

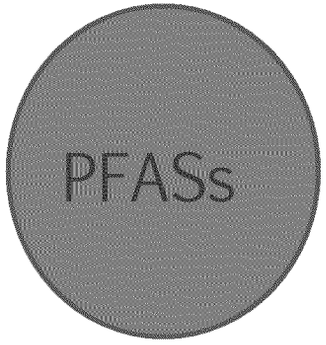
Region 5 Activities and Challenges

Kim Harris, R5 PFAS Coordinator
R5 State/Tribal Water Quality Standards Meeting
September 14, 2017

Briefing Outline

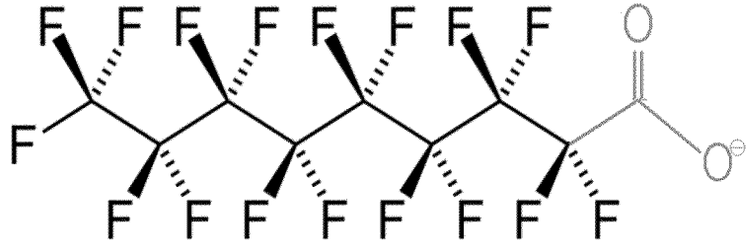
- PFAS Background
- PFOA/PFOS Information and Health Advisory
- Region 5 Areas of Concerns
- Challenges





BACKGROUND

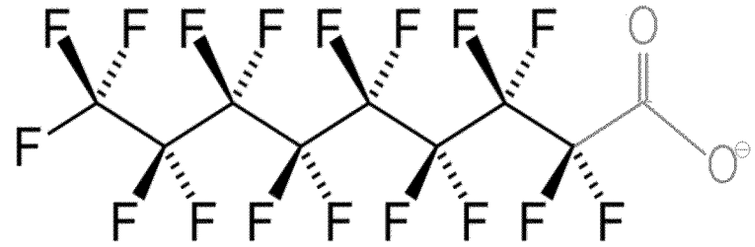
- Large class of manmade chemicals consisting of a carbon chain with surrounding fluorine atoms and functional end.
- Properties of PFAS depends on carbon chain lengths and functional end group.
- PFAS generally occur as mixtures (during production of intended products, many residuals and precursors are carried forward into the final formulations).
- Great surfactants and stain preventers as they repel both oil and water.
  - Carbon Tail= lipophobic /oleophobic/ hydrophobic
  - Functional End= hydrophilic



BACKGROUND

They are persistent in the environment and found globally due to:

- High mobility in water and soil (shorter PFAS tend to be more highly mobile than longer PFAS).
- Not known to degrade in the environment.
- Wide use in consumer products and industrial applications (resistant to stains, grease, oil and water).



Previous and Current Uses: Industrial and Consumer Products

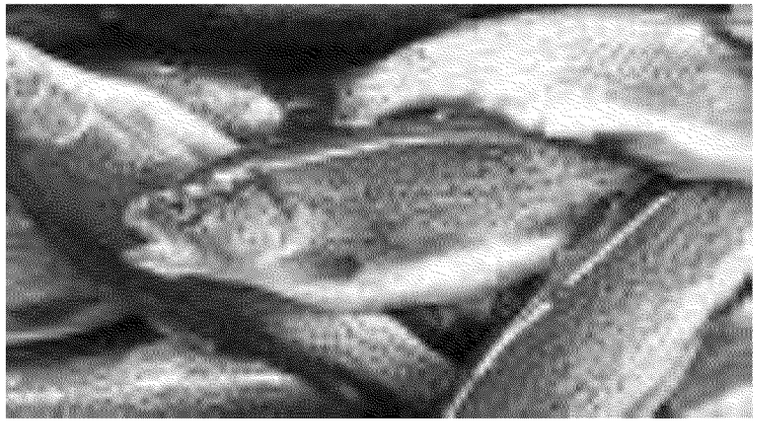
- Stain repellants for clothing, carpeting, upholstery (brand names examples: Stainmaster, ScotchGard, Gore-Tex)
- Aqueous film-forming foams (AFFF)
- Food contact surfaces, paper and cardboard packaging (like cookware, popcorn bags, pizza boxes, food containers, wraps
- Industrial and household cleaning products (such as shampoos, floor polish, toothpaste, car wax, and dishwash g liquids).
- Paints, varnishes, and surface coating
- Electronics industry
- Plastics, resins, rubbers and adhesives
- Chromium electroplating and finishing
- Photographic industry
- Semiconductor industry

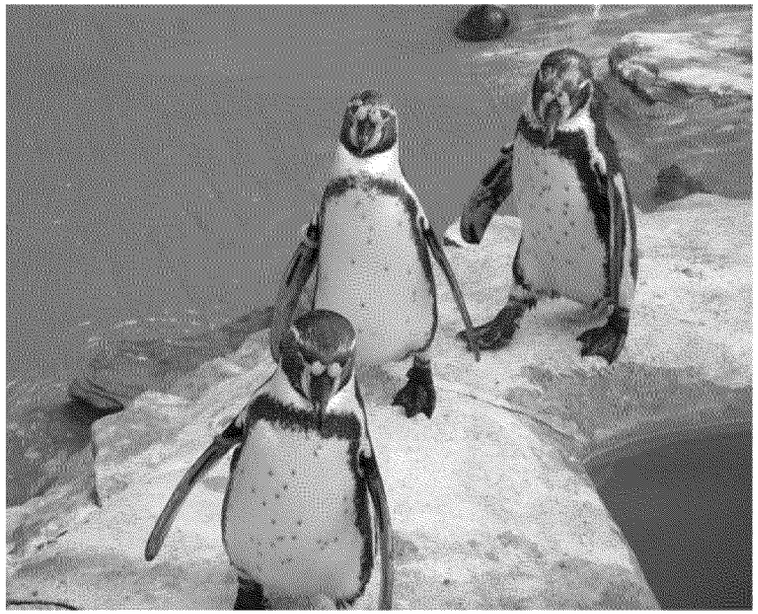
PFOA/PFOS have been phased out and shorter chain PFAS are replacing longer chain. However, safety of replacements are in question

Why the Concern?

Concerns are due to:

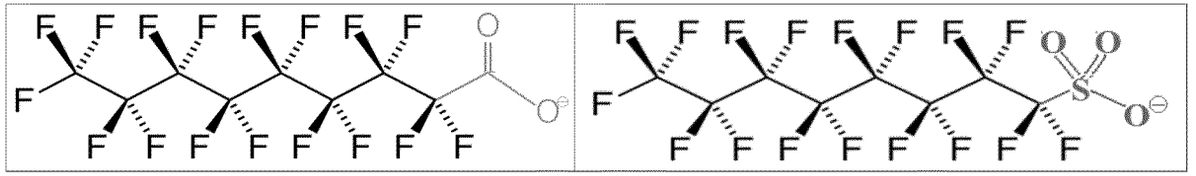
- Widely distributed in water, air, wildlife, and humans
- Detected in remote areas (as far as the artic)
- -Resistant to biodegradation
- Bioaccumulative
- Can persist in humans for several years
- Known or suspected toxicity, especially for PFOS and PFOA





PFOA and PFOS

- PFOA and PFOS are both 8 carbon-length atoms and the most widely studied and produced.
- Manufactured in the US since the 1950s.
- Stable in the environment (including water).
- Have low volatility but adsorb to airborne particulates and can be transported long-range.
- Mobile in water and soils, and bioaccumulative.
- Persistent in the human body (half-life ranging 2-5 years).
- Six CDC NHANES surveys between 1999-2012 found PFOA and PFOS in 99.7% and 99.9% of the U.S. population (but declining due to **phase-out**).
- Health Advisory for PFOA/PFOS was revised from 400/200 ppt, respectively, to 70 ppt (individual and combined)



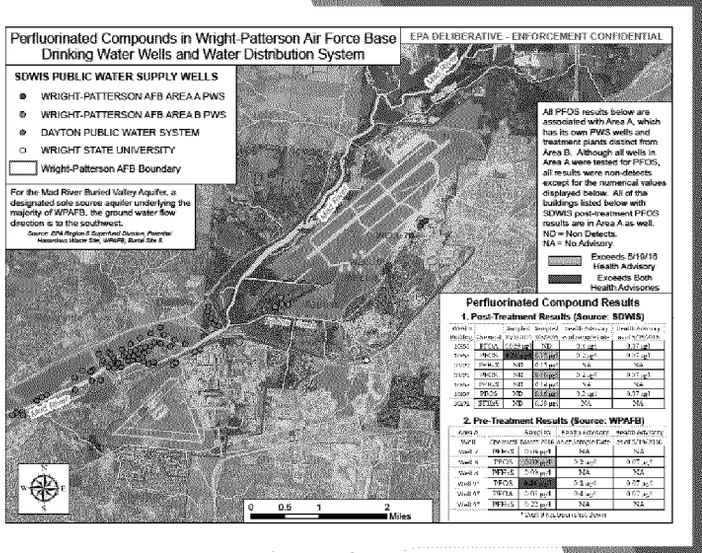
Federal and State Health Advisories

Office	Drinking Water (µg/l)					Residential Soil (mg/kg)		Fish (µg/l)		Recreation Water (µg/l)		GW Remediation (µg/l)	
	PFOA	PFOS	PFBA	PFNA	Combined	PFOA	PFOS	PFOA	PFOS	PFOA	PFOS	PFOA	PFOS
USEPA-OW[i]	.07	.07	--	--	.07 PFOA+PFOS	---	---	---	---	---	---	---	---
U.S. EPA-OSWER & R4	---	---	---	---	---	16 mg/kg	6 mg/kg	---	---	---	---	---	---
Illinois EPA	USEPA 2016 HA	USEPA 2016 HA	---	---	USEPA 2016 HA	---	---	---	---	---	---	USEPA 2016 HA	USEPA 2016 HA
Michigan DEQ	USEPA 2016 HA	USEPA 2016 HA	---	---	---			0.42 (dw and fish ingestion) 12 (fish ingestion only)	0.012 (dw and fish ingestion) 0.012 (fish ingestion only)	7700 (aquatic, acute) 880 (aquatic, chronic)	780 (aquatic, acute) 140 (aquatic, chronic)	.42 (sw & gw)	.11 (sw & gw)
Minnesota	0.035	0.027	7	7	---				>800				
New Hampshire	EPA 2016 HA	EPA 2016 HA	--	--	.07 PFOA+PFOS	0.5 mg/kg	0.5 mg/kg	--	--	--	--	EPA 2016 HA	EPA 2016 HA
New Jersey	0.014 (proposed)	---	---	0.01	---								
Vermont	0.02	0.02			0.02 PFOA+PFOS							0.02 PFOA+PFOS	0.02 PFOA+PFOS

Region 5 PFAS Hot Spots

- Unregulated Contaminant Monitoring Rule 3 (UCMR3)
  - 7 PWSs in Region 5 with levels above the PFOA/PFOS Health Advisories
    - Dyer, IN (non detects in follow-up samples)
    - Freeport, IL (investigation in place to identify source)
    - Bemidji, MN (wells vulnerable to fire fighting foam discharged at near by airport)
    - Oakdale, MN (well in not in regular use)
    - Cleveland Heights, OH (non detects in follow up samples)
    - Wright-Patterson AFB (shut down wells based on OEPA order)
    - LaCrosse Waterworks, WI (well shut down)

Region 5 PFAS Hot Spots



Wright Patterson AFB

- **OH/West Virginia: DuPont/Chemours -** Region 5 issued a revised Emergency Consent Order to DuPont/Chemours jointly with Region 3 in early 2017. PFOA waste from the DuPont's Washington Works facility contaminated portions of WV and OH. The order requires DuPont to offer treatment, connection to a PWS, or temporary bottled water to people on public or private water systems with PFOA levels above 70 ppt. The OEPA formally requested that USEPA remain the lead on this enforcement effort.

- **OH: Wright-Patterson AFB (near Dayton):** Discovered PFAS contamination in two municipal water wells at Wright Patterson Air Force Base in the spring of 2016. The wells were taken off-line in December 2016 through partnership with the OEPA's water program. The Air Force Base has informed consumers as required and plans to install drinking water treatment at the impacted wells eventually. The EPA Superfund program is overseeing a site investigation at Wright-Patterson Air Force Base, a federal Superfund site. The PFAS investigation began in November 2016 and EPA expects a site investigation report for the PFAS groundwater contamination in the fall of 2017.

Wurtsmith AFB

Region 5 PFAS Hot Spots

- **MI (Wurtsmith AFB):** MDEQ is monitoring the status of heavy PFAS contamination at the former Wurtsmith Air Force Base. PFAS contamination has impacted soil, groundwater, surface water and some area fish and wildlife due to extensive use and improper disposal of aqueous fire-fighting foam. Contaminated groundwater has migrated off the base and contaminated downstream Oscoda private drinking water wells. There is concern that the chemical plumes may reach Lake Huron.

- **MI (Camp Grayling/Grayling Army Airfield).** PFAS were recently detected in monitoring and downstream private wells (3 wells above HA). MI Army National Guard, in consultation with state and local agencies, plan to sample all drinking water wells between Army Air Field and Au Sable River, as well as initiate full PFAS investigation summer 2017. Public meeting planned for fall 2017.

- **MI (near Grand Rapids):** MDEQ/MDHHS has recently launched an investigation to determine whether PFAS contamination found near Rogue River is due to Wolverine World Wide (a tannery best known for manufacturing of Hush Puppies and Merrell). Leftover chemicals used for shoe waterproofing may have leached off site and contaminated the surrounding area. PFAS testing to begin August 28, 2017.

- **MN**: Significant PFAS contamination was found in parts of the eastern Twin Cities. From the 1950s to early 1970s, 3M disposed of PFAS manufacturing wastes in various dump sites and landfills resulting in contamination of drinking water wells in seven communities (covering nearly 100 sq. miles), aquatic life, soil, groundwater, area lakes and the Mississippi River. 3M agreed to pay for treatment, research, and clean-up. MDH initiated biomonitoring program, ATSDR conducted health assessment, and MPCA led remediation efforts. Work continues.

Region 5 PFAS Hot Spots

Challenges

Only One EPA PFAS Lab Method (drinking water).

– Agency working to develop multi-lab validated methods for other media beyond drinking water

Health Advisories for Only 2 PFAS chemicals.

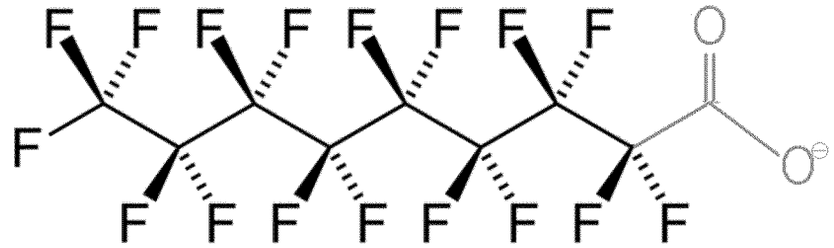
- Reviewing toxicological literature for 30 PFAS to develop quantitative values

Little Information on Alternative Chemicals.

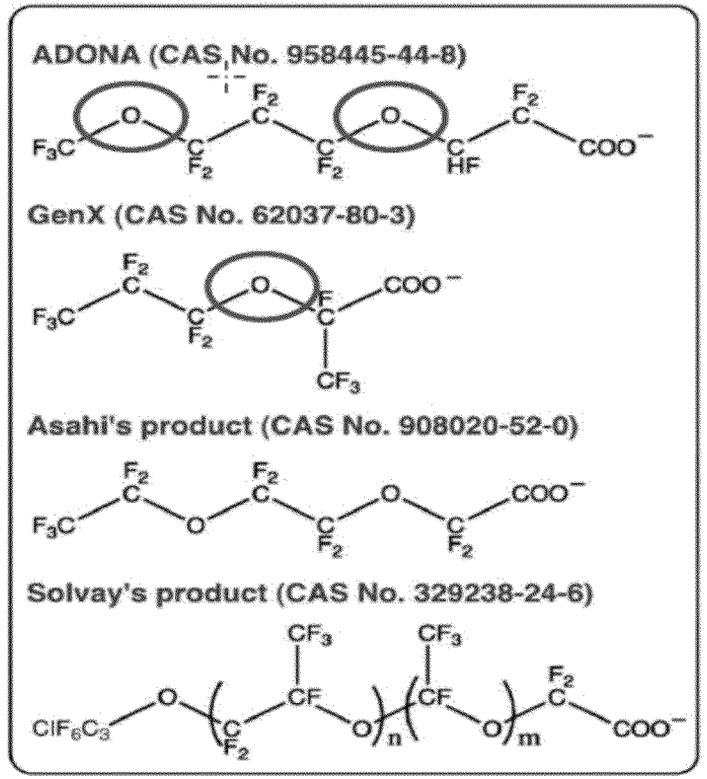
- Researching toxicity, exposure and developing new analytical methods

Alternative Chemicals

- Many companies ceased production of longer chain PFAS chemicals but replacing with alternatives.
  - PFOA: GenX (DuPont/Chemours)
  - PFOS: ADONA (3M)
  - AFFF next-gen chemicals



Fluoropolymer manufacture



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Toxin taints CFPUA drinking water

MOST POPULAR

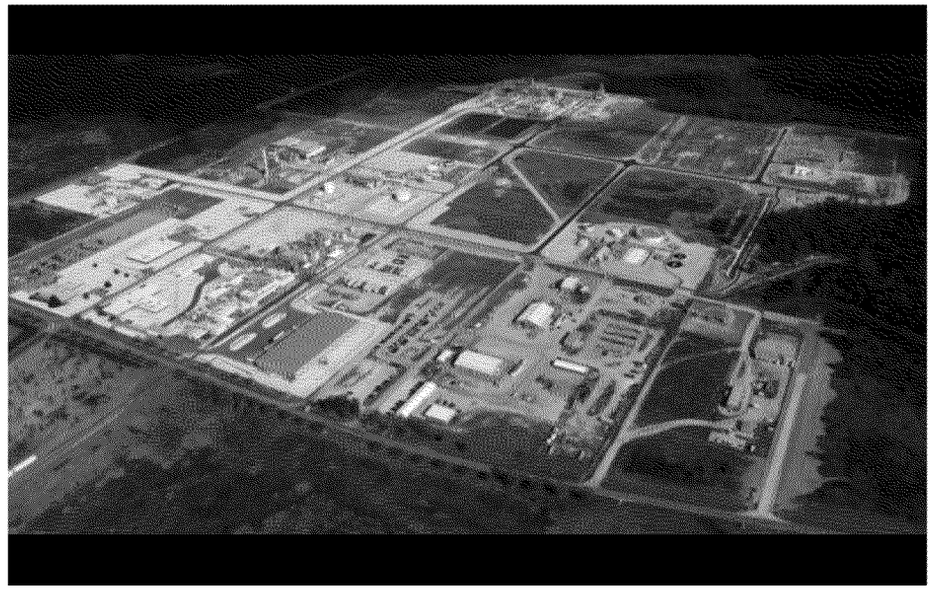
1 Carolina Surf condos - in danger of collapse - condemned, evacuated
Jul 2 at 5:50 AM

2 Man injured by hook, not bit by shark at Wrightsville Beach
Jun 30 at 1:43 PM

3 Murder suspect had other charges pending
Jul 2 at 5:44 AM

4 Residents not allowed back into Carolina Surf condos
Jul 4 at 7:33 AM

OUR PICKS



▲ HIDE CAPTION

A 2000 aerial photo of Fayetteville Works on the Cumberland-Bladen county line. The site, home to several plants, one of which makes GenX, is about 100 miles upstream from Wilmington. [COURTESY OF THE FAYETTEVILLE OBSERVER]

By Vaughn Hagerty StarNews Correspondent
Posted Jun 7, 2017 at 10:31 AM
Updated Jun 8, 2017 at 10:38 AM

Utility can't filter out chemical produced upriver

Cape Fear River
Fayetteville to Wilmington, NC

1. Conducted Chromium Electroplating Study which supported OAQPS;s MACT standard disallowing PFOS use as fume-suppressant.

2. Published two studies examining PFAS uptake into crops grown in PFAS contaminated biosolids/soils.

3. Host of PFAS SharePoint Site used Agencywide as a tool for info sharing and discussion.

4. CRL developed PFAS methods published in as two ASTM methods and 4 SOPs.

5. CRL assisting with cross-Agency method validation & exposure work.

6. CRL/ORD developing new precursor methods under RARE grant

7. CRL assisting with site Characterization and Source ID at RI, MN, CA/AZ, and AK.

Region 5 PFAS Products

Comments/Questions